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[INSURANCE]

PROBLEMS FACED BY DEVELOPING COUNTRIES AND COUNTRIES IN TRANSITION IN THE AREA OF INSURANCE AGAINST CATASTROPHE PERILS

A summary of the major components and structures for catastrophe insurance schemes

Study by the UNCTAD secretariat

CONTENTS

Chapter	Paragraphs
Executive Summary	
Preface	i - iv
Introduction	1 - 20
PART I	21 - 52
THE ROLES FOR THE COMPONENTS OF THE INFORMATION REQUESTED IN THE 10-COUNTRY STUDY OF CATASTROPHE EXPOSURE	
Basic Country Demographics	21 - 22
Exposure to natural perils	23 - 32
Values at risk	33 - 36
Target risks	37 - 38
Accumulation risk	39
Insurance industry relative capacity	40 - 45
Provision of catastrophe insurance in each country's market	46
National financial resources	47 - 52
PART II	
COMPONENTS AND STRUCTURES FOUND IN EXISTING SCHEMES	53 - 95
Perils insured	55 - 56
State involvement	57 - 62
Events that trigger the operation of the scheme	63 - 65
Lower and upper limits of indemnity	66 - 69
Is catastrophe cover' stand alone, or is it conditional upon existing insurance?	70 - 71
Sources of premium for catastrophe schemes	72 - 74
Methods of funding and financing	75 - 81
Voluntary cover and legislated cover	82
Rating	83 - 87
The role of reinsurance	88 - 95

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EXECUTIVE SUMMARY

- Part I of this session paper explains the function of the different pieces of basic data needed before one can implement a catastrophe insurance scheme or approach the established insurance markets to assume the risk.

- Part II of the session paper describes the various features found in existing catastrophe insurance schemes which combined form the essential components to be considered if a new scheme is to be created.

- Much of the basic data from which to underwrite catastrophe risks already exists in many countries, but a 10 country survey has demonstrated that in many countries this information has not yet been fully brought together or maintained in a way which makes it accessible to those wishing to provide insurance against a particular catastrophe peril.

- Communication and cooperation are required between those organizations which currently maintain data on the type, location and value of national assets to make these existing inventories available to insurers and those charged with creating catastrophe insurance schemes. This means that information currently obtained for ordinance survey purposes, censuses, town and country planning and property valuation to determine rateable values for local taxation needs to be accessible as it all forms the basis for determining risk exposures and accumulations.

- Without basic information on risk exposure and on the catastrophe perils it is intended to insure against, the dimensions of a catastrophe insurance scheme are indefinable. Therefore, it is necessary first to tackle the issue of obtaining the necessary information before an appropriate structure for a catastrophe insurance scheme or a conventional insurance solution can be proposed.

- Unless catastrophe cover is both available in the local market and also being taken up by a significant proportion of the owners of all exposed property, government involvement is likely to be necessary to influence the level of utilization of catastrophe cover. All insurance relies upon a mutualization process, spreading risk so that the losses of the unfortunate few can be funded by the premium payments of the many who are exposed to a potential hazard. Providing cover against catastrophe perils is no exception and for the insurer to obtain a good geographical spread is most important. The need to avoid anti-selection from accumulations is a major concern to prevent the financial failure of a scheme when a catastrophe occurs.

- All countries need to have a strategy which contemplates how they can meet the financial demands which could result from the various types of catastrophe peril to which they are exposed. Such a strategy should recognize the threshold where insurance and other financial resources are exhausted and the need for local or international aid payments will arise. Differentiation should be made between funding solutions where reinstatement is available up to the limit of reserves and capital already accumulated, and financing where money is raised following the catastrophe and is repaid out of future premium income. The latter solutions require ongoing prior negotiation of standby credit facilities to be utilized in the event of a catastrophe.

- In addition to actively promoting the availability of the necessary information on risks and exposures, government may need to become involved in two different ways so as to ensure that catastrophe insurance is available in one form or another and is also taken up where market forces have not already resulted in the availability and use of adequate catastrophe cover. The government may first become involved by passing

legislation requiring property to be insured against catastrophe perils and requiring insurers to offer such cover. In some countries this may be sufficient to promote conditions for adequate schemes to be developed by insurers and the private sector without further government involvement.

- Secondly, in conditions where sufficient capital, reinsurance and other risk financing facilities are unavailable, it may be necessary for the government to then become more directly involved in the provision of catastrophe cover by furnishing the necessary guarantees for whoever is to operate the catastrophe insurance facility so that cover for the full value of each risk may be offered. Such involvement of the government may be temporary if, once the catastrophe insurance facility is established, commercial insurers can be found to issue cover which will replace the government guarantee and remove the need for the government to act as "insurer of last resort".

PREFACE

(i) The Work Programme of the Standing Committee, established at its first session on insurance, from 1 to 5 February 1993, requests the Committee, under part B, Fostering Competitive Insurance Services, "to examine alternative mechanisms to meet the insurance and reinsurance needs in respect of:

- Catastrophes;
- Environmental impairments;
- Large risks;

particularly in times of reduced reinsurance capacity".[1]

(ii) The Standing Committee at its second session, from 4 to 8 July 1994, affirmed that the study of catastrophes, environmental impairment and large risks should be continued. The Standing Committee agreed with the views expressed in the UNCTAD secretariat's study[2] that a significant contributing factor to the less than adequate levels of catastrophe insurance cover available in many developing countries may be the absence of adequate information on aggregate exposures, both in respect of assets at risk and perils capable of causing catastrophes.

(iii) The Standing Committee recommended that the secretariat may:

(a) Prepare a compilation and analysis of existing catastrophe insurance schemes based on information provided by member countries;

(b) Conduct a test survey in 10 countries to collect comprehensive data on catastrophe exposures with a view to collating the information and enabling insurers and reinsurers to gain a better understanding of the problems.

(iv) The compilation and analysis of existing catastrophe insurance schemes[3], and the test survey in 10 countries to collect comprehensive data on catastrophe exposures[4] are contained in two background papers to be read in conjunction with this session paper. This session paper is in two parts. Part I describes the components of the information requested in the 10-country study of catastrophe exposure. Part II describes the components and structures found in existing catastrophe insurance schemes. Both parts of this paper are explanatory notes for use with the relevant background documents.

INTRODUCTION

1. This session document discusses the issues arising from the substantive work of the secretariat on catastrophe insurance since the second session of the Standing Committee, in July 1994.

2. The compilation and analysis of existing catastrophe insurance schemes and the test survey in 10 countries to collect comprehensive data on catastrophe exposures have been produced as background documents because the information which they contain cannot be made to fit within the physical constraints imposed for session documents where the maximum space allowable is in total not more than 24 pages.

3. For the compilation of existing catastrophe insurance schemes, a survey was conducted specifically to determine which developing countries have working catastrophe insurance schemes in place. Requests for information were sent to 131 countries. The vast majority of respondents confirmed that they do not currently have a working catastrophe insurance scheme.

4. For the test survey in 10 countries, to collect comprehensive data on catastrophe exposures and the capacity of the country's insurance industry and economy to withstand the financial impact of catastrophes, the 10 countries were selected to provide examples from different parts of the world where natural catastrophes represent a significant concern. Included are some examples which illustrate the particular problem of both large and small island countries.

5. The sample comprises the following 10 countries:

- Algeria
- Chile
- Cyprus
- Guatemala
- Mauritius
- Mexico
- Peru
- Philippines
- St. Kitts and Nevis
- Turkey

Full details are included in UNCTAD/SDD/INS/8 and UNCTAD/SDD/INS/11.

6. The first part of this paper explains the contribution of the different components of the survey information requested for the 10 country survey on catastrophe exposure. The second part examines the features, methods of operation and criteria applied in different existing catastrophe insurance schemes.

7. The summary gives a general overview of the methodology employed by countries in implementing schemes to provide insurance against specific catastrophe perils and the conditions which have to be satisfied before such schemes are called upon to respond. The discussion on the components of the survey information requested for the 10 countries explains the relevance of each component, and the necessity to have at least this basic information available in order to embark on any form of catastrophe insurance. Such information should ensure that the worst case cost of losses when an event occurs can be provided against. Equally, the probability of occurrence of each contingency and the annualized cost can be calculated to ensure that, irrespective of whether insurance is purchased commercially on the world markets or if a local catastrophe insurance scheme has been created, sufficient funds can be made immediately available to cover the cost of losses. It is essential that adequate annual premiums be charged in order to accumulate sufficient funds to cover fully the cost of losses over the return period of the peril insured against, irrespective of which method of insurance is employed.

8. The background documents "A Ten Country Analysis of Catastrophe Exposure, Insurance Sector and Country Financial Capacity to Bear Risk" and "Comparative Examples of Existing Catastrophe Insurance Schemes" are complementary to this session document and should be read in conjunction with it.

9. The information needs which have to be satisfied before a catastrophe insurance scheme can be structured on any basis which has a possibility of being financially sound are examined first. It should be noted that much of the information needed has already been collected for other purposes and exists in censuses, town and country planning departments, information upon which municipal rates and taxes are levied, provision of public services such as water, gas and electricity, and ordinance survey map-making.

10. Once exposure can be quantified, a variety of schemes may be appropriate to fund or finance the loss as a result of specific catastrophe peril. The component parts of some existing catastrophe insurance schemes are described in part II of this paper along with the advantages and disadvantages of various approaches to providing a solution. Before embarking upon the provision of any form of insurance, whether covering low-value, high-frequency losses or very high-value, low-frequency catastrophe losses, knowledge of the risk and the peril insured against is essential if the insurance scheme is to perform successfully in providing adequate protection under all envisaged scenarios, and is to have received sufficient funding in the form of adequate premiums, reserves and financing so as to enable it to respond to the demands which may be made upon it.

11. The required level of knowledge for a scheme to be successful is the same irrespective of whether it is provided by the State out of taxation, by the local insurance industry, or largely through reinsurance in the international market.

12. National and local government is likely to be already in possession of a significant proportion of the information needed, although often it may not yet have been brought together in the same place in the form needed to evaluate potential catastrophe losses.

13. Throughout the world there is a trend towards an ever-increasing concentration of valuable property in industrial and urban areas, with the introduction of new technologies, in combination with increasing population density which aggravates the degree of catastrophe exposure from an insurer's point of view.

14. In order to structure a scheme capable of providing adequate cover in the event of a catastrophe, it is essential to know what is exposed to being destroyed, where it is located in relation to other property, the degree of damage which is likely to result as reflected in standards of construction and occupation of property, and the population distribution and densities.

15. Once values at risk and their probabilities of loss as a result of a specified peril are recorded, estimates of possible loss costs can be calculated for different scenarios.

16. Most catastrophe perils act independently of each other, so that the financial provisions required to pay for damage from each peril to which a risk is exposed must generally be calculated completely independent of each other. This is not so for risk information, which to a large extent can be shared by a number of schemes covering losses caused by completely different types of peril.

17. For example, a country may be exposed to catastrophe losses as a result of perils such as earthquake, volcanic eruption, windstorm and flood. To be able to estimate the potential costs of loss as a result of any of these perils, information is needed, inter alia, about (a) population density, (b) type, location, construction and occupation of buildings, (c) standards of construction, (d) effects of local geography and subsoil conditions.

18. The type and extent of damage from each of these perils at any location is likely to be very different, but the risk information needed by which to estimate the likely loss scenarios will be drawn from the same sources.

19. In conventional property insurance, often each risk can be considered separately on its own merits; while losses are frequent they are usually only for a small proportion of the sum insured. Catastrophe insurance, however, is concerned largely with aggregates. Compared with conventional insurance, catastrophe losses are infrequent; they are likely by some degree to affect every risk within the region subject to the operation of the catastrophe peril; moreover, they are likely to be for a large proportion of the overall sums insured for all properties in the region. For many individual risks, the possibility of total loss is very high.

20. For many catastrophe perils, there is usually a worst affected area while surrounding districts may be affected to a lesser extent. Matching information values and types of property within zones where the theoretical frequency and intensity of the catastrophe peril has been estimated allows quite detailed forecasting of loss costs, and a basis for calculating the annualized charges which must be paid in order to provide a given amount of cover.

PART I

THE ROLES FOR THE COMPONENTS OF THE INFORMATION REQUESTED IN THE 10-COUNTRY STUDY OF CATASTROPHE EXPOSURE

Basic country demographics

21. Country size is significant in determining catastrophe exposure. Small countries and most islands can themselves constitute a single zone, the whole of which can be affected by a single catastrophe. In larger countries, not all of the country may be exposed to catastrophe perils and, equally, a catastrophe can only extend to a proportion of the total area at risk on any one occasion.

22. Information on how the population is distributed is an important indicator of major concentrations of value and risk. Where densely populated urban areas are also located in parts of a country particularly exposed to one or more catastrophe risk, loss costs are likely to be significantly higher. Country-wide average population densities are not good indicators of the distribution of the country's assets at risk to natural or man-made catastrophes even in large countries with relatively small populations. Australia serves as a good example to illustrate this phenomenum. With a land area of 7,682,300 square kilometres and a total population of only 16 million, 66 per cent of this population is concentrated in five cities: Brisbane, Sydney, Melbourne, Adelaide and Perth. Their total land area is about 5,400 square kilometres, approximately two and a half times the size of Mauritius.

Exposure to natural perils

23. For an assessment to be made, it must be clear which specific peril protection is to be provided for, and what potential levels of damage are anticipated. If protection is required against more than one peril, then each has to be addressed completely independently; certainly as far as the need for separate funding arrangements this is a necessity.

24. The country itself may not have maintained long-term records of past loss experience of help in providing a statistical basis on which to estimate future events.

25. Taking earthquake as an example, it is nevertheless possible to calculate basic premiums for such cover with sufficient accuracy by calling upon international experience concerning the consequences of earthquakes occurring in other parts of the world.

26. Scientific records dating back to around 1900 and reports of even earlier earthquake events have enabled researchers to develop a chart of magnitudes as a basis for determining their return periods.

27. After this, it is strictly local information which enables a calculation to be made of the likely extent of actual losses. Distance of a particular property at risk from the epicentre, local geographic features such as subsoil conditions, height, construction standards and occupation of properties are all factors determining the extent and potential cost of the damage.

28. Mathematical formulae are used to calculate how the intensity of a quake decreases with increasing distance from the epicentre. In this way a regional magnitude chart is converted into a local intensity chart.

29. Although there are certain regions or even entire countries from which no up-to-date or useable statistics are currently available, tables, based mainly on world-wide loss experience, do enable expected average loss ratios to be calculated for different intensities.

30. Provided that local information identifies the various categories of building type and occupancy (e.g. residential property, commercial or industrial buildings, their standard of construction, height, age, etc.), expected loss amounts can be generated. The sum of such amounts will indicate the level of reserves or funding needed to back a catastrophe insurance scheme in order to cover this peril. The Risk Premium to be paid in annually for such a scheme is then the sum of all the individual loss amounts divided by the return period of an event of a given intensity.

31. This simplified description of how the Risk Premium is determined is given in order to show the critical importance of local data in this process. In practice the information needed is the same but mathematically there are more iterations in the summation process because of the desire to include all losses from a range of intensities and return periods.

32. The annual cost or premium, in practice, will also include other components as well as the pure cost of risk. Deductibles and coinsurance, as well as upper liability limits have the effect of reducing the insured loss and the pure Risk Premium required. The annual cost of administering the scheme, new business acquisition, claims handling and investigation will all be expenses which have to be added onto the pure risk premium. Another important component is the cost of the capital which provides the security backing the scheme. This cost will differ according to whether the scheme is funded or financed, and whether the source of funds is to be from the public or private sector. The use of capital will in any case have to be paid for. The cost is represented by two components:

- the normal "risk free" rate of return available in the market; i.e. the prevailing rate of interest

- an additional payment as a reward for risk, since on the happening of the peril insured against, the capital will be called upon to pay the amount by which the loss exceeds the premiums so far accumulated by the scheme. Following a loss, there is likely to be a time delay of several years before the providers of capital can be reimbursed from future premium payments, or possibly the arrangement is that they will not be reimbursed at all. In the latter case, the payment as a reward for risk-bearing will be greater than if the capital were ultimately to be repaid. In the first case, the capital providers perform risk financing while in the second case the capital providers perform a true insurance function.

Values at risk

33. Different regions of a country may be exposed to different catastrophe perils. Within regions, different zones are likely to have very different values and types of risk. The different zones may also be exposed to differing magnitudes of a peril. For such reasons it is necessary to know the values at risk and the type of property within each zone in order to estimate the overall country exposure and the potential funding which may be required from one source or another when a catastrophe occurs. The insurer will want to know his accumulation and exposure zone by zone so as to manage his own risk retention and reinsurance programme and to be aware of the extent to which the insureds may be selecting against the insurer in buying cover for particular areas only.

34. The State can also benefit significantly from information on overall values at risk in each zone and the extent to which the risks have been insured. In the absence of any other source of funds for reinstatement following a catastrophe, the role of "Insurer of Last Resort" will be forced upon the State which may, or may not, have plans in place on how to meet such a contingency. Information on exposure, risk cost and existing insurances would be a valuable tool in structuring, costing and funding contingency arrangements. It can also be a useful policy tool in formulating legislation which may require a minimum level of compulsory catastrophe insurance to be purchased by organizations and individuals if they are to qualify for State assistance in the event of a more serious catastrophe occurring which causes damage in excess of the minimum compulsory cover.

35. For structuring any catastrophe scheme, whether insured by the private sector or covered by the State, information on the value and location of all risks in all zones and the perils to which they are exposed is of great importance. If the risks are spread across several zones which, although exposed to the same peril, are geographically far enough apart that the peril can only affect any one zone at any one time then the capital requirement, and likewise possibly the risk premium, will likely be lower than if the majority of the property were located within an area all of which could be affected by one event.

36. This information on risks and location can also generate a good indication of the revenues one could expect a scheme to generate at various levels of penetration.

Target risks

37. Single risks of very high value within any zone significantly increase the exposure and potential claims cost for an insurer if the zone is affected by a catastrophe peril. Information on the largest or "target risks" within a zone is important in estimating the "Maximum Possible Loss" following a major catastrophe. This estimate will have significant implications for decisions relating to how such a loss may be funded. For an insurer this knowledge is likely to trigger the need to seek substantial reinsurance. In constructing a reinsurance solution for very high value single risks, many reinsurers may be needed since their own security and capacity limits will mean that they can only be relied upon to be able to pay a relatively small portion of a major loss. It is certainly not in the interest of the insured to involve a reinsurer for more than an amount that the latter can easily bear and pay in the event of a major loss unless the reinsurer can show how it has reinsured itself with good quality security, be in a position to respond to calls for cash in the event of such loss, and so justify the size of the participation which the reinsurer is proposing to accept.

38. Target risk information is important even if the information on total values at risk within a zone and insurer's accumulations is incomplete.

Accumulation risk

39. The total value insured within a zone is of critical importance when insuring against catastrophe perils since all risks within a zone are simultaneously exposed to the operation of the peril. Any scheme for insurance against catastrophe must maintain information to be able to ascertain the maximum value that it may be asked to pay to reinstate property in any one zone affected by the catastrophe peril. For an insurer, it will equally be critical to know the total sums that he insures within each zone for each peril insured against. Additionally, at the next level of detail, the sums insured and replacement values by types of construction and occupation of buildings will enable an estimation to be made of loss costs and a more accurate premium calculation for each risk.

Insurance industry relative capacity

40. Exposures and values at risk determine the expected values for losses as a result of a particular catastrophe peril. Financial information on the insurance industry of a country is needed to measure its maximum capability to insure against catastrophe without recourse to international reinsurance. Also considered is the insurance industry's current exposure to catastrophe losses.

41. For catastrophe insurance to be effective and readily available within a country, local insurers must offer catastrophe cover alongside other traditional services and this must be available through all established distribution channels.

42. The international reinsurance market can usually only provide catastrophe reinsurance if the perils are included in original covers offered by insurers in the local market.

43. Local insurers should be sufficiently well capitalized and the total capacity of the local insurance industry, relative to the economy of the country, should be sufficient to underwrite the type of risks within the country.

44. Subscription of new capital to the insurance industry needs to keep in step with growth in capital values within the country's economy.

45. Examination of the financial information on a country's insurance industry will reveal to what extent the industry may need to expand if it is to be able to service the country's catastrophe insurance needs.

Provision of catastrophe insurance in each country's market

46. Information under the headings in this section reveals to what extent cover against catastrophe perils is already offered by insurers in the local market. It also shows the extent to which such cover is currently purchased and the degree to which insureds are required to participate in the risk via the application of deductibles.

National financial resources

47. Of equal importance to a country's insurance industry's capability to bear risk and to pay large losses are the overall financial resources within a country's economy which could be called upon when a catastrophe occurs.

48. The limit of such financial resources will be the ultimate constraint on a country's ability to reinstate from its own resources the damage caused by a catastrophe. Government policy will decide if, and to what extent, such resources are utilized. While Governments may decide when and where to utilize any of the country's financial resources, the total amount available is finite and represents the absolute limit of a country's financial capacity to respond to a catastrophe.

49. Consideration of the country's overall financial resources is very important in many developing countries for two overriding reasons. The first is that relative to the national income and assets of the country, a catastrophe may cause such damage that a very large proportion of the country's resources may have to be expended to achieve reinstatement. This may itself result in further additional damage to the economy of the country. In some extreme cases, the country may have insufficient resources to ever be able to reinstate the catastrophe damage. Contingency planning on the use of available resources is therefore critical.

50. The is a second reason why consideration of the country's overall financial resources is important. It is necessary to be able to measure the efficacy of the country's insurance industry, and to determine whether measures should be taken to encourage additional investment and growth within the insurance sector. Many developing countries have recently been going through a period of rapid change in the structure of their economies. Manufacturing and service sectors have expanded so that they now contribute quite a high proportion of GNP. The need for insurance created by such change is probably even greater than the growth of the new sectors themselves. In many developing countries the insurance industry has not matched the growth of the sectors which are its major customers and, relative to their size and the values now at risk, the industry is significantly undercapitalized and under-resourced. This poses a problem because these countries as a result do not have an insurance sector which can provide for their current insurance needs. The economies of these countries are capable of absorbing far greater losses than suggested by the size and reserves of their insurers, and indeed these countries need and could support an insurance industry which could account for a far greater proportion of GDP.

51. In considering any catastrophe insurance proposals, the government must be informed of the extent to which it may voluntarily, or involuntarily in the absence of any alternative insurance, become involved as "insurer of last resort". It also needs to be able to judge the extent to which there is a possibility for the insurance sector to be encouraged to grow to take up some of the additional risk.

52. For the international insurance market, or a local catastrophe insurance scheme to be able to offer cover in respect of the major catastrophe risk exposure of a country's insurance sector, it will require the same level of information about a country's insurers, and national financial resources irrespective of whoever is to provide such cover. The overall financial viability and projections of how the scheme will respond with payment of claims in the event of a catastrophe, and proposals for its continued funding and recovery are critical to the international insurers' ability to decide on whether they can offer cover and on what terms they can become involved. If governments as well as insurance companies become involved in a catastrophe scheme, information is necessary so as to be able to judge the quality and security of any financial guarantees which may have to be relied upon. To this extent there is little difference between the financial judgement which has to be made in respect of such a contract, and the methods used for the relative rating of government bonds and other securities.

PART II

COMPONENTS AND STRUCTURES FOUND IN EXISTING SCHEMES

53. As mentioned in the introduction a compilation of existing insurance schemes in tabular form designed to facilitate direct comparison by the presence, absence, size, etc. of a range of standard features has been produced as a background document (see UNCTAD/SDD/INS/11).

54. This section draws on the content of the background document and examines the features, methods of operation and criteria applied in different catastrophe insurance schemes, so as to promote discussion of when and why various components and features are appropriate.

Perils insured

55. Some catastrophe insurance schemes provide cover against a range of different perils; others cover several related perils; still others cover a single peril only. This should confuse no one, as apart from some possible savings by avoiding duplication of administrative costs, a scheme covering five different perils is essentially equivalent to five separate schemes which just happen to be operated by the same administrators. Each peril will have to be assessed and costed independently, and exposures to each individual peril will have to be separately calculated before the estimated worst case loss costs for each peril can be calculated. It is essential to have this knowledge in order to establish the possible calls that could be made for payment on the happening of a loss event.

56. From this information it is then possible to estimate the potential overall loss costs and the level of funds that the scheme must have at its disposal to be viable. A decision will have to be made as to how such amounts will be funded or financed and the annual cost of the chosen solution will be the basis for the total premium cost which will have to be met from the source of revenue chosen as the most appropriate.

State involvement

57. The role of the State in catastrophe insurance schemes varies from complete control of all aspects, to the alternative situation, where the system is left entirely in the hands of insurers. For existing schemes, the extent of State involvement is usually a product of history, but in recent years the State has tended to become involved in the provision of catastrophe insurance cover when the insurance market has been unable to offer a facility or where businesses and the population have elected not to take up the cover available from insurers, so that significant national assets remain unprotected. Ultimately, when a catastrophe happens the Government would have to face the problem of what to do about uninsured losses; hence much State involvement has been an effort to pre-empt such a problem.

58. The State can become involved at various levels; the first is at the level of enacting laws to govern under what conditions the catastrophe cover is to be made available; this may include some legal obligation for insurers to offer such cover and for purchasers to avail themselves of cover against the prescribed perils. In such circumstances it may be unnecessary for the State to become more deeply involved as long as insurers are able to offer sufficient capacity and to obtain adequate reinsurance of undoubted security. Other than the State's involvement to put in place a legal framework, the system can be left entirely in the hands of the insurers.

59. The next level of State involvement would be triggered when insurers are unable to offer sufficient capacity and as a result the insurer finds it necessary to offer cover for sums insured which have to be restricted to such low levels that they are far less than the value of much of the property at risk. Such a situation can undermine many opportunities for the country's whole economy: if property cannot be insured, then banks will refuse to accept such property as collateral and will not lend to industry and commerce to finance growth in trade and development. There are many reasons why insurers may have to restrict capacity for catastrophe perils, but essentially they all reflect the need for insurers to be responsible and prudent, to ensure that if an event occurs they will have the resources available to pay all valid claims.

60. Capacity to insure ultimately reflects the underlying value of the capital and reserves of an insurer, and of the additional capacity that the insurer can access by reinsurance. For catastrophe exposures, a very large reinsurance utilization is necessary to spread the risk, often among hundreds of reinsurers, so that the ultimate loss for which each reinsurer is responsible is well within the reinsurers's ability to pay. There are many requirements which have to be

satisfied so as to maintain adequate reinsurance arrangements; sometimes reinsurers also have to restrict the capacity they are able to offer.

61. Where capacity is not otherwise available, it may be necessary for the State to provide this capacity itself by guaranteeing the payment of claims for the catastrophe events insured under the scheme. In such a case the State is actively assuming the role of "insurer of last resort" by underwriting the solvency of the insurers who are operating the scheme. In such instances the State's involvement may not necessarily be permanent, but the State guarantee enables insurers to accept risks at 100 per cent of their value and to receive correspondingly greater premium income. In the absence of large claims in the early years of such a scheme, the accumulated premiums will have built up reserves, so that the insurer's own capacity will have increased and the need for reinsurance, or to call upon the State guarantee, will be reduced. Once the viability of a scheme has been established it may also be possible to replace the State guarantee with conventional reinsurance or other direct financial funding alternatives, such as long-term or irredeemable "catastrophe" bonds in much the same way as many Governments issue War Loan Stock to finance the cost of hostilities.

62. The ultimate way in which the State may become involved is where it assumes direct management of the catastrophe insurance scheme, possibly performing all functions, although in most cases the private sector is utilized for collection of premiums and often also in the assessment and recording of losses. Premiums may be obtained from the private sector by adding the catastrophe premium to the premiums charged for specified existing classes of insurance policy and paying such amounts over to the government. The premia may be equally generated by a levy on the turnover of the insurance sector or any other part of the economy, or may be simply funded out of general taxation.

Events that trigger the operation of a scheme

63. For private sector insurer only schemes, the events which result in claims under these kinds of insurance are well described in the definitions of perils insured against, and the excess values or deductibles whose value the damage must exceed before any claim is payable. Any dispute over whether an event may or may not be covered by the insurance is decided using established principles of commercial and insurance law.

64. When there is State involvement, the rules may change to include additional discretionary action by the State. Thus, for example, not only might it be necessary that there be serious flooding resulting in damage of a very high value, but until some State assembly decrees that it is to be classed as a "national emergency", no claims are payable under the scheme.

65. Where payments under a scheme rely upon a State assembly to declare the disaster a national or state emergency, the scheme becomes a discretionary payments plan and the strict rules of insurance no longer apply. It is far more difficult to reinsure this type of plan commercially since reinsurers are in no position to accommodate the discretionary nature of such payments.

Lower and upper limits of indemnity

66. Catastrophe insurance is almost self-defining in that it is intended to pay for very large losses as a result of major disasters. For this reason, a substantial excess or franchise is invariably incorporated within the rules while claims for losses below a relatively high minimum value are generally excluded. It must also be recognised that resources available to a catastrophe scheme are finite and this will limit the maximum amount that is capable of being paid. In practice all schemes have an upper limit; it may be very high, but there is no such thing as an "unlimited" sum insured. The upper limit of cover which a scheme can provide may vary from time to time and may increase as a scheme grows in size.

67. The lower limit or excess value which a loss has to exceed before any payment is made may in some instances be an absolute currency amount and in other instances a percentage of the sum insured or the replacement cost. Often both approaches are incorporated in a requirement that the loss must be in excess of an absolute currency value or a percentage of replacement cost, whichever is greater.

68. An excess which is expressed as a percentage of replacement cost is good practice since this encourages property owners not to under-insure, and to keep their sums insured up to date.

69. High excess points can reduce the cost of cover significantly because they exclude a very large number of small claims. In this context it should be remembered that catastrophe cover is not intended to reimburse the cost of claims which the insured would otherwise, relatively easily, be able to pay from their own resources.

Is catastrophe cover "stand alone", or conditional upon existing insurance?

70. Most catastrophe insurance is made available in some way alongside other types of insurance, often simply to utilize existing methods of distribution, premium collection and claims payment. Many catastrophe perils are insured by extension of the cover provided by existing fire and consequential loss insurances with the fire insurer collecting the premium and paying it over to the catastrophe insurance scheme. In other instances the catastrophe cover is purchased through the issue of a completely separate policy and the policy may or may not require that other insurances also be in force at the time a claim is made.

71. Some State run schemes funded by a levy on insurers or by other taxes may pay for any losses which fall within the conditions set, while others demand that claimants prove that they have in force a certain minimum level of conventional insurance which can be with any insurance company for the catastrophe scheme to entertain a claim from them.

Sources of premium for catastrophe schemes

72. For schemes where there is no State involvement, the annual payments for catastrophe cover usually follow the general pattern for other forms of insurance premium. A separate policy of insurance is issued for each insured and the premium paid directly to the catastrophe insurer, or the catastrophe insurance scheme may be a separate entity that reinsures cover for the catastrophe peril granted by other insurers, often as an extension of cover to other types of insurance policy. Where the catastrophe insurance scheme acts solely on a reinsurance basis, instead of premiums being calculated for each individual risk there may be a formula whereby each insurer pays over a proportion of the annual premium income for particular classes of business to reinsure against the particular catastrophe peril.

73. For schemes where the State is involved, but is acting as reinsurer to the primary insurers who issue the cover and pay the claims, the rate for the peril is usually fixed by the State and is mandatory. Premiums are paid over by insurers to the State catastrophe scheme just as they would pay any other reinsurance. Commissions, if any are laid down by the State.

74. For schemes where the State intervenes to impose cover for certain events of a catastrophic nature, there is usually a uniform surcharge on the basic premiums for property damage contracts. This uniform tariffication implies that those least exposed help pay for those who are most exposed. Thus the premium is effectively a tax on certain classes of revenues of insurers. Payments for such cover may also be collected as part of State property taxes. Eligibility to benefit from the cover under such schemes is not necessarily limited to an insurance policy although in some instances evidence of ownership of a property damage contract may be a requisite before any claim is considered. The type of

scheme which attempts to provide cover for the population as a whole, irrespective of a specific contract of insurance and payment of a premium reflecting the value and exposure of each risk, is moving away from the principles of insurance and may be more difficult to reinsure commercially if precise values for exposure and accumulation are not obtainable. Indeed, for such schemes, a surcharge on certain revenues of insurers may be no more appropriate for collecting the annual fees than a surcharge on any other payment for the use of property or raising the necessary money through general taxation.

Methods of funding and financing

75. As well as considering the methods by which annual premiums can be generated, one has to consider how the scheme is to be enabled to pay for losses when these occur.

76. For a scheme to be fully funded, it must have adequate capital and accumulated reserves to meet all possible losses as they occur. If a scheme is not fully funded, then, unless it is to be unable to respond adequately for some loss events, it must employ some methods of risk financing, the most common of which is to purchase reinsurance.

77. Some forms of insurance are "unfunded" or "pay-as-you-go" schemes. Typically, many health insurance plans and State unemployment insurance schemes are in this category. If claims exceed premiums then the deficit is carried over to the next year when subscriptions are increased to make up the difference. This is completely inappropriate for a catastrophe insurance scheme where claims in a year when a major catastrophe occurs can be very large indeed, typically there should be high volatility between years in which a catastrophe occurs and years when little happens. Unless sufficient premiums have been accumulated during claim-free years to satisfy any anticipated situation, all schemes require access to external sources of finance should their obligations in the face of large claims threaten to overstrain their current financial resources and their ability to pay further claims.

78. For schemes where there is no government involvement, the most common structure is for the scheme to accumulate funds which will enable direct payment of the lower level losses. Above such a level, reinsurance is purchased but the reinsurance itself will have an upper limit above which claims will again have to be paid from the fund. Reinsurance may also be purchased where the fund has sufficient assets to carry that layer of the risk itself, but to reinsure may be cheaper because of differentials in the investment returns that the reinsurer is obtaining, relative to the returns being achieved on the fund's own investments.

79. The fund may also keep in place permanent arrangements with banks and other providers of finance for access to lines of credit which may be called down when needed. Other forms of debt instruments, such as bonds, may be issued to generate the high levels of liquidity to which the fund may require access.

80. Government involvement in many catastrophe insurance schemes results from the difficulty to arrange adequate reinsurance and external financing; in such instances the risk is covered by a government guarantee. While most Governments, particularly in a market economy, would wish to minimize their liabilities, guaranteeing a catastrophe scheme may not be as onerous as it would appear at first sight, since in the absence of any insurance, the Government would also ultimately be left with the same problem of what to do about losses. By guaranteeing a scheme, the Government is effectively formalizing its decision in advance of the event and, as a by-product, enabling the creation of a scheme which can begin establishing funding for future loss from premiums paid from private resources, so that this ultimately offsets the cost to the Government when the loss occurs. Such a scheme is quite capable of being transferred to the private sector when adequate reserves have been accumulated and if reinsurance becomes commercially available.

81. Some Governments that offer State guaranteed catastrophe cover do not accumulate the premiums they receive from surcharges and elsewhere to fund future losses. These amounts simply go into the general pool of taxation. Claims, depending upon their size, will be paid from taxes, additional government debt or by increasing the money supply. Such an approach is likely to be inflationary and cannot be transformed to a stand alone scheme without being recapitalized by the Government.

Voluntary cover and legislated cover

82. In some countries, legislation makes it obligatory for all property owners to purchase cover against certain perils, including some catastrophe perils. In other countries purchase of such catastrophe cover is not required by law; however, even so it may not be entirely "voluntary" since, for example, banks may not be prepared to lend money to businesses for everyday transactions unless their property, which is the bank's ultimate collateral, is insured against catastrophe perils.

Rating

83. Catastrophe schemes may have unregulated tariffication where premiums are individually underwritten to reflect the local conditions pertaining to each risk. This is most common in schemes without State involvement. It allows the greatest flexibility in charging a rate appropriate to the risk borne.

84. Some pools and State guaranteed schemes have a less flexible but formalized tariff allowing the rate charged to vary over quite a wide range, reflecting standard classifications of risk, location, etc.

85. Other schemes have a fixed surcharge on the basic premium charged by an insurer for property damage cover; quite obviously this will be unlikely to reflect the appropriate catastrophe rate for all risks and locations. Those risks paying higher rates for property cover will also pay equally more for catastrophe cover.

86. An alternative fixed price approach is to charge a mandatory rate for all properties irrespective of risk and location so that complete mutualization is encouraged as the least exposed risks pay for those most exposed.

87. General levies and other forms of tax-based funding are other ways of generating sufficient premia, but do not rely upon rating, although the total revenue raised will ultimately need to be adequate to cover claims.

The role of reinsurance

88. For insurers to be able to offer cover against catastrophe perils, an effective reinsurance mechanism must be available. Without this facility, individual insurers will be severely limited by the relatively small size of their capital and reserves. Consequently, they will only be able to offer cover for very low sums insured and will have to limit carefully the number of risks they can accept in any one location since the accumulation would soon result in the exposure exceeding the capacity of their capital and reserves to pay in total claims costs with the occurrence of any one event.

89. The extent to which reinsurance can be organized will reflect a number of factors. The willingness of any insurer to reinsure another insurer will be influenced by the quality of the information about the risk. Hence, the need to obtain sufficient data such that the true risk premium can be calculated with sufficient confidence to satisfy the reinsurer that the price is right uppermost. The proportion of the risk which a reinsurer can accept is also limited by his own capital and reserves and his access to further reinsure the risk that he himself has accepted as reinsurance. Locally this retrocession business, whether facultative or treaty is only effective when there are well developed distribution channels between insurers. In some countries this distribution is

provided by brokers; in others insurers have established an efficient communication and settlement network among themselves. Frequently, a combination of the two methods is employed.

90. Insurance of very large risks and catastrophe perils, when reinsuring an insurer's whole portfolio, is generally only achieved on a subscription basis, that is, where a very large number of reinsurers write a very small "line" each. For the world's major risks, and to reinsure the largest insurers and reinsurers, the international insurance brokers design and manage such programmes.

91. International reinsurance markets are not organized to provide cover for 100 per cent of losses arising from the effects of catastrophe perils. The function of the reinsurer is to provide cover when the loss exceeds the amount which the local insurer or the combined resources of the local insurance market can afford to pay, but only up to an upper limit. Only in exceptional cases are reinsurers found to write cover against catastrophe perils if that cover is not being offered by local insurers, albeit subject to their own capacity constraints.

92. Reinsurance is never for an unlimited amount. Limits may be very high, for example a programme may pay for all losses exceeding US$200 million up to US$750 million, but once the losses exceed the US$750 million level, the insurer again becomes liable for amounts over and above this amount unless he can find more reinsurance cover.

93. Reinsurance security is of paramount importance in choosing reinsurers to provide cover for catastrophe perils. Of equal importance is ascertaining that each reinsurer in the programme is not accepting such a large proportion of the risk that in a worst case loss scenario it may be questionable whether he is capable of paying his share. Setting up a catastrophe reinsurance programme and continually monitoring the exposure and financial capability of participating reinsurers is a skilled operation and ideally should be provided by independent professionals, such as the international brokers and rating agencies, so that insurers are only allowed to continue in the programme with participation, where their ability to be able to perform financially is beyond doubt.

94. Natural catastrophes have return periods well in excess of the normal one-year accounting period of most insurers, so reinsurance programmes are designed to respond over the expected return period. For this reason, they should be regarded as long-term contracts for both the insurers and reinsurers. Only by maintaining reinsurance arrangements in place for the return period of a catastrophe will sufficient funds be accumulated to meet the full extent of the insured loss.

95. Reinsurance can only operate for schemes where the perils are well defined, the property properly identified and insured to its full replacement value and full information on the risk and the peril insured against is available to underwriters so that the risk-cost is capable of being calculated. Schemes which provide compensation which relies upon some subjective action such as the declaration of National or State emergencies are discretionary payment plans. Owing to this subjective element they cannot be accommodated within the reinsurance market which is geared to providing cover against the occurrence of strictly defined, measurable events.

Notes

1. TD/B/CN.4/19

2. TD/B/CN.4/32

3. UNCTAD/SDD/INS/8

4. UNCTAD/SDD/INS/11

5. UNCTAD/SDD/INS/8

6. UNCTAD/SDD/INS/9